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New data on *Synanthedon pseudoscoliaeforme* Spatenka and Arita, 1992 (Lepidoptera, Sesiidae) in Japan

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Abstract Two alder trees (Betulaceae), *Alnus hirsuta* from Hokkaido and *A. serrulatoides* from Aichi-ken, Honshu are newly recorded as host plant for *Synanthedon pseudoscoliaeforme* Spatenka and Arita, 1992. A redescription and description and figure of genitalia of both sexes are given.

Key words Sesiidae, *Synanthedon pseudoscoliaeforme*, host plant, taxonomy.

Synanthedon pseudoscoliaeforme Spatenka and Arita, 1992 was described from a single, non-fresh female deriving from near Kyoto, Honshu, Japan. In the course of our investigation of the clearwing moths of Japan, we have found one female collected by Mr K. Yazaki in Gifu-ken, Honshu. Additionally, Mr S. Kawahara sent to us for determination two males and one female of this species from Hokkaido, which had been bred from *Alnus hirsuta* (Betulaceae). And finally, in the course of our studies of the ontogeny of *Synanthedon multitarsus* Spatenka and Arita, 1992 in the neighbourhood of Nagoya, Aichi-ken, Honshu, we have been lucky enough to breed further three specimens (2 males and 1 female) from another alder tree, *Alnus serrulatoides*. Thus, now we have four males and four females of *S. pseudoscoliaeforme* at hand, including the holotype, which are mostly in good condition.

As this species was described from a single non-fresh specimen, without a study of the genitalia, and the male sex has remained unknown altogether, we take the opportunity to redescribe this species in detail, including both male and female genitalia. All specimens examined are deposited in the collections of the senior author (CG) and Zoological Laboratory, Faculty of Agriculture, Meijo University, Nagoya (MUT).

Synanthedon pseudoscoliaeforme Spatenka and Arita (Figs 1-8)

Synanthedon pseudoscoliaeforme Spatenka and Arita, 1992: 101, fig. 4. Type locality: Japan, Kyoto, Takaragaike. Holotype female, in MUT; Spatenka *et al.*, 1993: 95; Arita, 1994: 77, fig. 32; Arita *et al.*, 1994: 15, pl. 5, fig. 9.

Redescription. Male (Figs 1, 3, 5). Alar expanse 20.0-22.5 mm; body length 11.5-12.8 mm; antenna 6.5-7.2 mm. Head: antenna black with blue-violet sheen, mixed with yellow 1/3 subapically; frons black with blue-violet sheen, with a narrow snow-white stripe laterally; labial palpus yellow ventro-internally and black with blue sheen dorso-externally; vertex entirely black with dark blue sheen; pericephallic hairs black with a few dark yellow scales laterally. Thorax: patagium entirely black with blue-greenish sheen; tegula black with anthracite sheen, with a narrow, yellow margin internally, slightly dilated apically; meso- and metathorax entirely black with blue-green sheen;

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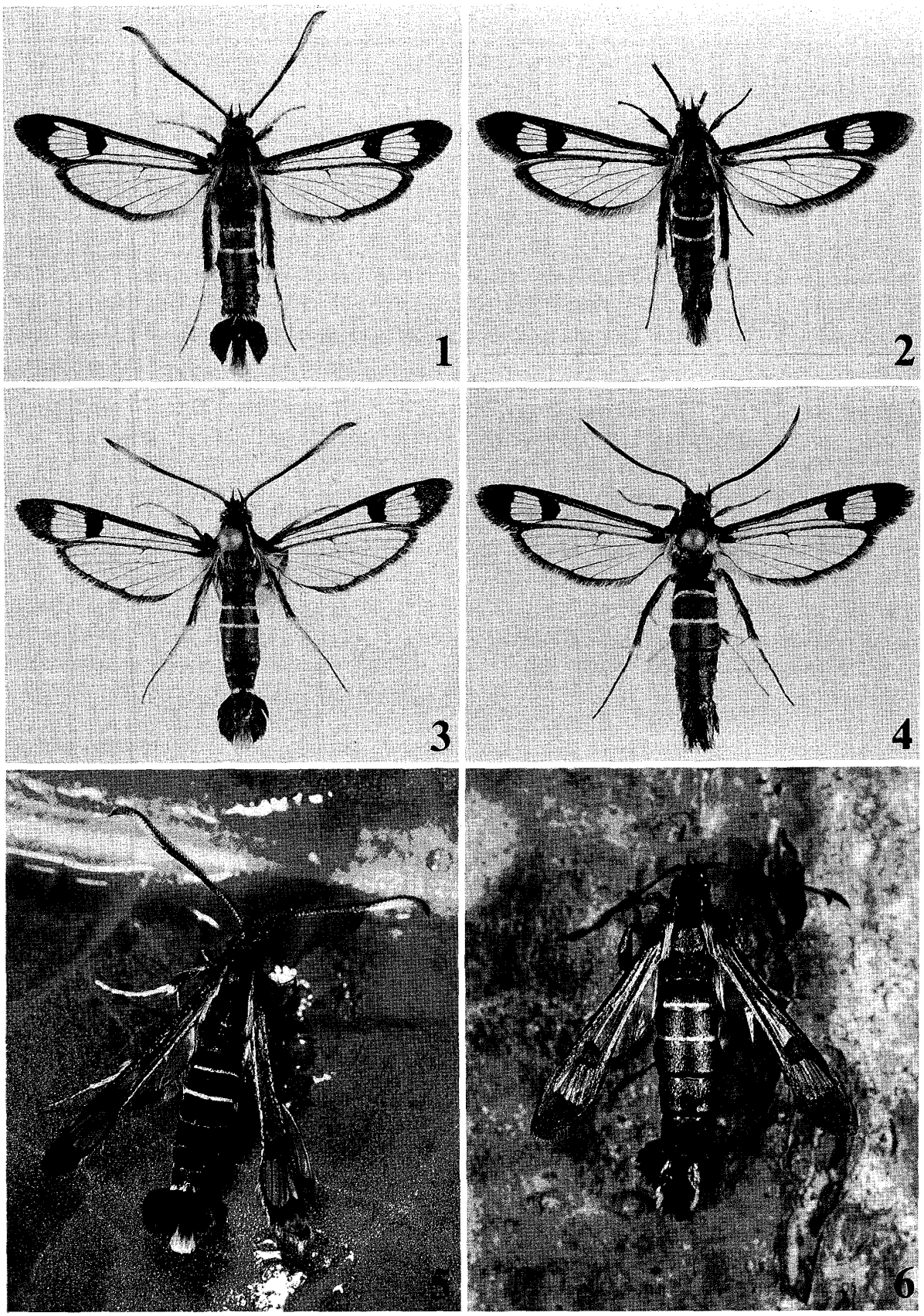

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besides that, tegula, meso- and metathorax covered with black hair-like scales with gold sheen; thorax laterally black with blue-violet sheen, with a large yellow spot. Legs: fore coxa black with blue-greenish sheen, with a narrow yellow stripe externally; fore femur entirely black with purple-blue sheen; fore tibia internally yellow to dark yellow, externally black with purple sheen, with admixture of individual pale yellow to white scales and with a small pale yellow to white spot apically; fore tarsus black with bronze sheen, with a broad (internally somewhat narrower) pale yellow to white ring apically on each tarsomere; mid femur and tibia entirely black with blue-violet sheen; spurs pale yellow to white; mid tarsus black with purple-bronze sheen, with admixture of pale yellow to white scales ventrally and basally on two basal tarsomeres; hind femur black with blue sheen; hind tibia black with blue-purple sheen, with a few pale yellow scales at base of mid spurs internally, and with a narrow yellow ring apically; spurs pale yellow to white; hind tarsus black with purple-bronze sheen, with a few pale yellow scales dorso-apically on basal tarsomere, and with a narrow pale yellow line with gold hue ventrally. Abdomen: dorsally black with green sheen; tergites 2 and 3 each with a narrow, yellow, distal margin, tergite 7 with a few yellow scales distally; sternites 1–3 yellow laterally, entirely black with blue-green sheen ventrally; lateral parts of anal tuft black with blue-violet sheen, with a few yellow scales distally; medial part dorsally black with blue-violet sheen, broadly edged with yellow, ventrally yellow with admixture of individual black scales with blue-violet sheen basally.

Forewing: basally black with green-blue sheen, with a few yellow scales; costal margin black with violet sheen, with a narrow yellow stripe between veins Sc and R-stem; anal margin yellow mixed with black scales with bronze sheen; Cu-stem black with purple sheen, with admixture of individual yellow scales; discal spot broad, broadly triangular proximally, black with blue-violet sheen; apical area relatively narrow, black with violet sheen; veins within external transparent area black with violet sheen; transparent areas well-developed; external transparent area broad rounded distally, divided into 6 cells, including a narrow cell between veins Cu_1 and Cu_2, at level of vein M_1 about 2.5 times broader than discal spot and 1.6 times broader than apical area; cilia dark grey with bronze sheen. Hindwing: transparent; discal spot, veins and outer margin black with bronze-purple sheen; discal spot extremely narrow, slightly dilated costally, reaching the base of common stem M_3–Cu_1; outer margin narrow, about twice narrower than cilia; cilia dark grey with bronze sheen, yellow anally.

Male genitalia (genital preparation No. GA-109) (Fig. 7). Tegumen-uncus complex (Fig. 7a) relatively broad; scopula androconialis well-developed; crista gnathi lateralis small, at base about twice shorter than crista gnathi medialis, nearly subcardiform; crista gnathi medialis long, somewhat narrower than crista gnathi lateralis, with distal margin divided into two extremely narrow cristae; valva (Fig. 7b) trapeziform-oval; crista sacculi curved dorso-ventrally, pocket-shaped, covered with strong pointed setae in anterior half, posteriorly somewhat roundly broadened; saccus (Fig. 7c) slightly broadened basally, with a somewhat bifurcate base, nearly as long as vinculum; aedeagus (Fig. 7d) relatively narrow, about 1.8 times as short as valva, with a few small teeth dorso-subapically; vesica with a few, irregular, nearly flat cornuti.

Figs 1–6. *Synanthedon pseudoscoliaeforme* Spatenka and Arita, 1992. 1. Male. Hokkaido, Shari-gun, Koshimizu-cho, Miwa, 9. XII. 1994, *ex* l., host plant: *Alnus hirsuta*. Alar expanse 22.5 mm. 2. Female. Same locality, date and host plant. Alar expanse 22.0 mm. 3. Male. Honshu, Aichi-ken, Asuke-cho, Wachihara, 16. IV. 1995, *ex* p., host plant: *Alnus serrulatoides*. Alar expanse 21.5 mm. 4. Female. Same locality and host plant, 6. III. 1995. Alar expanse 23.5 mm. 5. Freshly emerged male (data as for Fig. 3). 6. Freshly emerged female (data as for Fig. 4).

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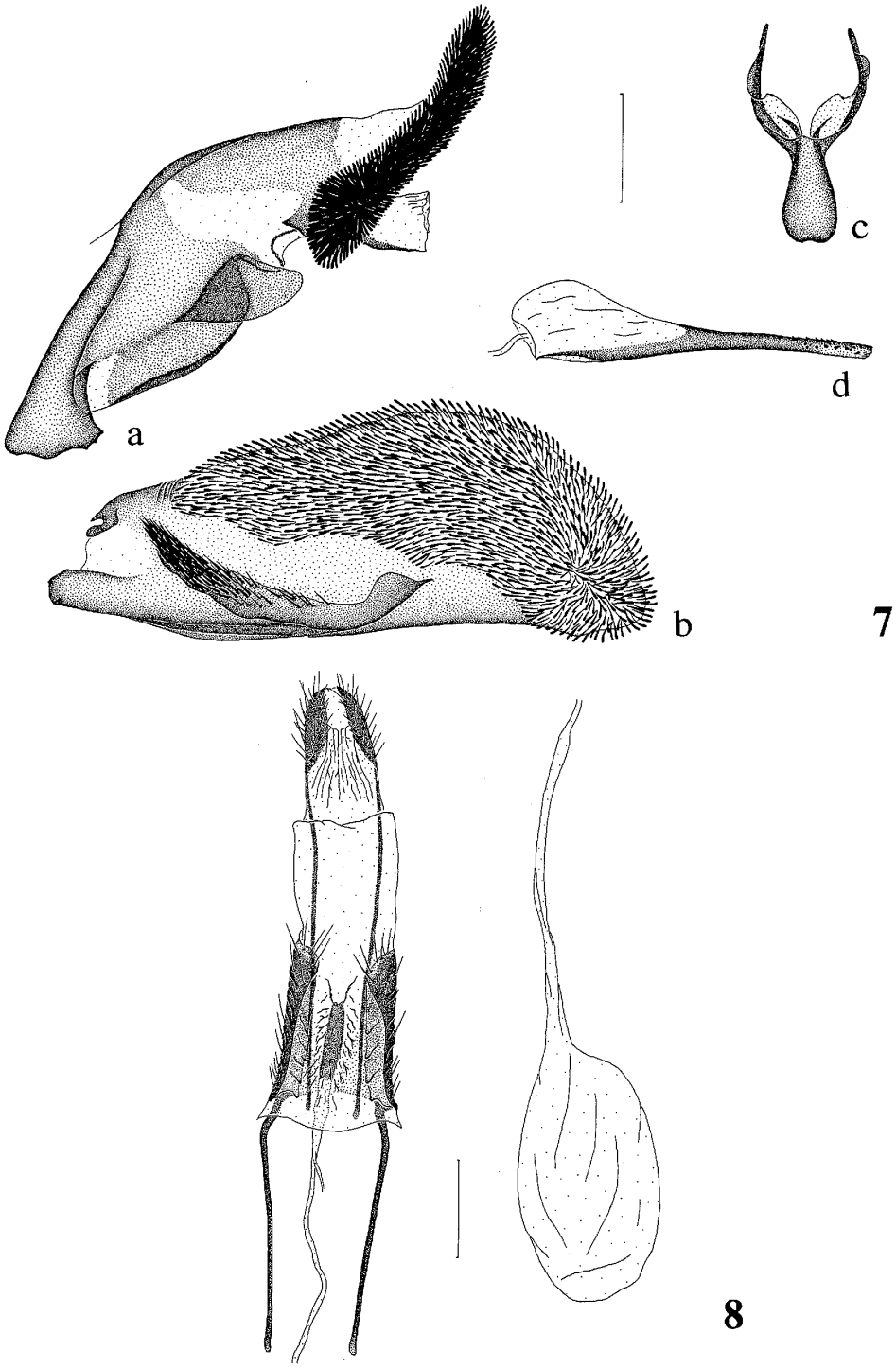

Figs 7-8. Male and female genitalia of *Synanthedon pseudoscoliaeforme* Spatenka and Arita, 1992. 7. Male genitalia (genital preparation No. GA-109) (a : tegumen-uncus complex, b : valva, c : saccus, d : aedeagus). Scale bar : 0.5 mm. 8. Female genitalia (genital preparation No GA-126). Scale bar : 0.5 mm.

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Female (Figs 2, 4, 6). Slightly more robust than male. Alar expanse 21.5–23.5 mm; body length 10.0–12.0 mm; antenna 6.5–7.0 mm. Fore coxa entirely black with blue-greenish sheen; fore tarsus entirely black with purple sheen; spurs of mid and hind legs black with admixture of individual pale yellow to white scales; tergites 2 and 3 each of abdomen with a narrow, yellow, distal margin only; anal tuft black with blue-green sheen, with admixture of individual yellow scales. Colour pattern otherwise as in male.

Female genitalia (genital preparation No. GA-126) (Fig. 8). Tergite 8 narrow with a few well-visible wrinkles and short setae over entire surface; papilla analis relatively small and narrow, covered with short setae; posterior apophysis about 1.4 times longer than anterior apophysis; ostium bursae narrow; antrum narrow, slightly sclerotized in posterior half; ductus bursae narrow, long, about twice as long as anterior apophysis, membranous; corpus bursae ovoid, membranous, without signum.

Variability. Old and not so fresh specimens are paler with pale yellow or white scales and with less numerous coloured scales. There are males with a nearly entirely pale yellow to white fore tarsus. Besides that, the external transparent area of the forewing is relatively variable, especially in females. It varies both in the number of cells (sometimes the cell between vein Cu_1 and Cu_2 is absent and then the transparent area is divided into 5 cells only) and in size (at the level of vein M_1 about 1.5–2.5 times broader than the discal spot). The specimens from Hokkaido have virtually no colour differences from those from Honshu (*cp.* Figs 1–2 and 3–4).

Diagnosis. By the structure of the both male and female genitalia, this handsome species seems to be closest to *Synanthedon culiciforme* (Linnaeus, 1758) and *S. talischense* (Bartel, 1906), and superficially it is somewhat similar also to *S. scoliaeforme* (Borkhausen, 1789), *S. mesiaeforme* (Herrich-Schäffer, 1846) and *S. spheciforme* ([Denis and Schiffermüller], 1775). Habitually, from *culiciforme* and *talischense*, this species is clearly distinguishable by the coloration of the abdomen (at least segment 4 with a red or red-orange ring in these species compared) and forewing (both base and costal margin mixed with red scales in *culiciforme* and *talischense*). By the characters of the male genitalia, *pseudoscoliaeforme* differs from these two species in the shape of the crista gnathi medialis (broader anteriorly and narrower posteriorly in *culiciforme* and *talischense*), and crista sacculi (broader anteriorly, strong and pointed setae present at the dorsal margin anteriorly only in these species compared). Besides that, *pseudoscoliaeforme* can be separated from *culiciforme* and *talischense* by the shape of the eighth tergite of the female genitalia (broader, without wrinkles, setae present only at the proximal margin in these species compared). From other three species compared, *pseudoscoliaeforme* differs first of all by the smaller size (alar expanse more than 25 mm in these species compared) and more slender body. In addition, this species can be easily separated from *scoliaeforme, spheciforme* and *mesiaeforme* by the coloration of the abdomen (tergites 2 and 4 each in *scoliaeforme* and *mesiaeforme*, and only tergite 2 in *spheciforme*, with a narrow yellow stripe distally) and anal tuft (entirely black in *spheciforme* and *mesiaeforme*, and sometimes in *scoliaeforme*, and black mixed with orange scales in *scoliaeforme*). Besides, *pseudoscoliaeforme* is clearly distinguishable from these three species compared by the male (an entirely different shape of the crista sacculi in all these species compared, and a different form of the aedeagus in *scoliaeforme*) and female genitalia (a different shape of the eighth tergite, ostium bursae, and antrum in these species compared). From other so-called "yellow-banded" species of the genus *Synanthedon*, this species is easily distinguished by various combinations of important characters, both external (coloration of the antenna, legs and abdomen, shape and size of the external transparent area of the forewing, etc.) and genitalia.

Bionomics. The host plants are *Alnus hirsuta* and *A. serrulatoides* (Betulaceae). The

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larva lives inside a relatively thick branch or stem of a rather young tree, sometimes jointly with the larvae of *Synanthedon multitarsus* Spatenka and Arita, 1992. Yet in contrast to the latter species, *pseudoscoliaeforme* does not push out the bored deposits. Hence, larvae of *pseudoscoliaeforme* are very difficult to find. Imagines appear from the second half of April to the end of July, according to the altitude. The life cycle is possibly univoltine.

Habitat. Floodlands and banks with alder thickest.

Material examined. 1 ♀ (holotype), Japan, Kyoto, Takaragaike, 10. V. 1957, K. Takeuchi leg. (MUT); 1 ♀, Japan, Gifu-ken, Kamitakara-mura, Abo-daira, 1,600 m, 21. VII. 1991, K. Yazaki leg. (MUT) (genital preparation No. GA-126); 2 ♂ 1 ♀, Japan, Hokkaido, Shari-gun, Koshimizu-cho, Miwa, 9. XII. 1994, *ex* l., host plant: *Alnus hirsuta*, moths emerged 4. I. 1995, S. Kawahara leg. (MUT); 1 ♂ 1 ♀, Japan, Honshu, Aichi-ken, Asuke-cho, Wachihara, 6. III. 1995, *ex* l., host plant: *Alnus serrulatoides*, moths emarged 28-29. III. 1995, O. Gorbunov, H. Nakano & F. Igari leg. (CG) (male with genital preparation No. GA-109); 1 ♂, same locality and host plant, 16. IV. 1995, *ex* p., moth emerged 20. IV. 1995, O. Gorbunov & K. Fukuzumi leg. (CG).

Distribution. Japan (Hokkaido and Honshu). Hitherto known only from a few localities in Honshu and a single one in Hokkaido. However, we believe this species has a wider distribution throughout Hokkaido and Honshu.

Acknowledgements

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摘　　要

フタスジコスカシバ *Synanthedon pseudoscoliaeforme* Spatenka and Arita, 1992 (鱗翅目, スカシバガ科) の新資料 (Oleg G. Gorbunov・有田　豊)

フタスジコスカシバ *Synanthedon pseudoscoliaeforme* Spatenka and Arita, 1992 は京都府の宝ヶ池で1957年5月10日に得られた不完全な♀で記載された．その後，1991年7月21日に岐阜県上宝村安房平 (1,600 m) で1♀が矢崎克己氏 (八王子) によって得られた．さらに1995年に入って川原進氏 (北海道小清水町) によってケヤマハンノキ *Alnus hirsuta* (ハンノキ科) より1995年1月1日と4日に羽化した2♂1♀が同定のため送られてきた．これらはフタスジコスカシバであった．また，ヒトスジコスカシバ *S. multitarsus* Spatenka and Arita, 1992 の調査で愛知県足助町月原で得たカワラハンノキ *Alnus serrulatoides* の細い幹よりフタスジコスカシバの2♂1♀が3月6日と4月16日に羽化した．愛知県足助町のカワラハンノキからはヒトスジコスカシバと共に羽化した．

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北海道の羽化個体は12月9日に終齢幼虫を得てすぐに室内で飼育し，それが1月1日と4日に羽化したものである．愛知県の個体は3月6日に終齢幼虫を得てすぐに室内にうつし，3月28-29日に羽化したものと，4月16日に採集（おそらく蛹）したものが4月20日に羽化したものである．これらはいずれもヒトスジコスカシバのように越冬後春に糞を外に出しておらず，また早く成虫が羽化することからおそらく越冬した幼虫は春に摂食せずにすぐに蛹化するものと推定される．外に出された糞のサインがないために幼虫の加害している幹の発見は非常に困難である．

原記載に用いた個体は不完全な♀個体であったので，雌雄のゲニタリアを含め再記載した．

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